

whorls five, slightly shouldered, body whorl more swollen aperture pointed and slightly expanded at junction with body whorl.

REMARKS: Shell as broad as it is high. Figure 4 and 4a is the nearest to normal obtained. In figure 13 we have all of the whorls except the apical ones entirely separated.

14. *AMNICOLA EXPANSILABRIS* n. sp. Pl. 10, figs. 14, 14a.

Shell small, whorls five and one-half, smooth, suture deep, umbilicus small, outer lip expanded and thickened.

Height 3 mm.

REMARKS: This species is the largest of all and is distinguished by its form and thickened outer lip. Strongly resembles a species of *Pachydrobia*, yet it may also be a pathologic freak. The above three species seem to be distinct, the variations and deformations may all be forms of one species. More material is necessary to decide. They certainly form an interesting study for the evolutionist.

Is its environment and food of salt and salination?

15. *PLANORBIS ANTIQUITUS* n. sp. Pl. 10, figs. 16, 16a and 16b.

Shell small, whorls four, rather flattened above, suture moderate. Lines of growth coarser and rougher as they approach the aperture. The younger shell shows numerous very fine growth lines, umbilicus deep with straight sides, aperture flattened ovate, outer lip somewhat expanded and slightly thickened within. The peristome thin, but continuous in old specimens. The umbilicus shows more of the whorls than the upper surface.

REMARKS: This form belongs to the *Planorbis bicarinatus* group and is quite distinct.

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NOTES ON COLLECTING SPHAERIUM AND PISIDIUM.

BY JOHN A. ALLEN.

In collecting Sphaerium and Pisidium I have obtained the shells most copiously and with the least amount of labor and eye-strain by the process described below. In Ohio the cold water and soft bottom make rubber wading-boots necessary. The collecting tool is a scoop of wire netting sold as a kitchen utensil under the name "strainer." The larger sizes, which are most efficient, usually need some improvement by cutting off projections or strengthening with solder.

The strainer is provided with a short handle. If a long handle happens to be required, the strainer can be temporarily fastened on a stick by winding around with a cord. Scrape off a slice of the bottom mud with the strainer, bring the rim above the water-surface, and swirl around. Mud and sand wash out, and a mixture of trash and shells remains. The strainer is now most easily emptied by passing it through water contained in a wash-basin. A dish-pan, if it is practicable to carry such a bulky utensil, is still better, because it will float beside the collector when working away from shore. If one is without any basin, the contents of the strainer are knocked or shaken upon a cloth.

The total product is usually carried home for treatment and put in a coarse sieve, which fits into a dish-pan or light steel kettle full of water. My sieve is made by nailing wire netting of one-fourth-inch mesh on a wooden frame. The mixture is worked with the fingers until the bivalves have passed out of the sieve into the dish. The sieve is now removed with its contents of sticks and leaves. These are looked over before being thrown away, as they often contain *Physa*, also may include very large *Sphæria*, such as *S. simile*, too big to pass through the sieve. Now one stirs up the water with the fingers and pours it off cautiously, puts in more water, and repeats the process as many times as required. The trash is thus washed away and a residue is obtained, consisting mainly of shells. If stones are present, a proper motion of the dish will now bring them to the opposite side from the shells, so that they can be removed. Then any conspicuous pieces of trash yet remaining are removed by hand-picking. Now, if any fine sand is present, the shells are brought into a strainer of finer mesh than the collecting strainer and washed free from it. The shells are now put in alcohol. Sometimes the use of the coarse sieve can be omitted, because little or no trash coarse enough to be retained by it is present. After one to three days the shells are taken from the alcohol and spread out to dry. If they are left too long in the alcohol there is danger of the valves opening.

The final purification can be deferred until winter, if wished. The shells are poured upon a sheet of paper in portions of about a half teaspoonful at a time, and a camel's-hair brush is used to push shells one way and dirt another. Before doing this it is often useful to remove the finest dirt, and then divide the shells into two or more sizes by a series of strainers or sieves of different mesh.

The minuter species of *Amnicola* may sometimes be collected by a process similar to that given above; except that for these one does not plough up the bottom, but strikes the strainer over the bottom or through the weeds. A mixture of species is usually obtained, which may be advantageously sorted with a reading glass.

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NOTES ON FOSSIL CALIFORNIAN PLEUROTOMIDÆ.\*

BY IRA M. BUELL.

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The very large collection of fossil forms of this group, made in the Pliocene of Santa Monica, California, by Dr. Rivers, formerly Curator of the Museum of the State University, has afforded the writer opportunity to institute interesting comparisons between forms previously classified under several subgenera of this group. The collection contains over one thousand specimens of these forms, hence the means to test the value of specific distinctions were far more perfect than were apparently present when the species were first described.

Subgenus *BORSONIA*.

Distinguished by plication on columella.

1. *Borsonia hooveri* Arn. Of 27 specimens examined, 16 have faint to obsolete columellar plication. One shows three faint ridges, while the rest lack the subgeneric distinction entirely. All agree in outline and number of whorls with Arnold's type, but about half have almost obsolete nodes on apical whorl like *D. renaudi* Arn., which this approaches.

2. *Borsonia bartschi* Arn. Of 70 specimens studied, 20 show plications faint to obsolete in most individuals, one has three, and one has two faint ridges on columella. About half have transverse ribs on the body whorl, and the rest are marked like *D. renaudi*,

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\*The Rivers Collection of above 100,000 specimens of fossil Californian Mollusca now becomes the property of Beloit College, Beloit, Wisconsin, and Pomona College, Claremont, California, half going to each of these institutions. Numerous important comparative studies have been made while the entire collection is still intact. This great collection indicates one thing with great certainty and that is that the work on the San Pedro and Santa Monica fossil Mollusca will have to be entirely recast. An examination of the material in *Fusus*, *Natica*, and other genera, indicate a condition similar to that described above for certain Pleurotomidæ.